

The Cone Shells (Gastropoda: Conidae) of the Abrolhos Platform, Brazil, with the Description of Three New Species

Edward J. Petuch ¹, José Coltro, Jr. ², and David P. Berschauer ³

¹ Department of Geosciences, Florida Atlantic University, Boca Raton, Florida 33431

epetuch@fau.edu

² Femorale São Paulo, São Paulo, SP, Brazil

shells@femorale.com

³ 25461 Barents Street, Laguna Hills, California 92653

shellcollection@hotmail.com

ABSTRACT Three new species of cone shells, in the genera *Coltroconus*, *Jaspidiconus*, and *Poremskiconus*, have been discovered on the Abrolhos Platform off central Brazil. These new taxa, *Coltroconus valianti* n. sp., *Jaspidiconus carlagrezziae* n. sp., and *Poremskiconus uhlei* n. sp. are restricted to the coral reef environments of the central platform area and are the newest additions to a highly-endemic localized conid fauna comprising 17 known species.

KEY WORDS *Coltroconus*, *C. valianti*, *Jaspidiconus*, *J. carlagrezziae*, *Poremskiconus*, *P. uhlei*, Conidae, Abrolhos Platform, Abrolhos Archipelago, Brazil

INTRODUCTION

The Abrolhos Platform is a roughly-rectangular widening of the central Brazilian continental shelf, covering over 46,000 square km. The main part of the platform extends from southern Bahia State to northern Espírito Santo State, and eastward approximately 280 km into the open South Atlantic. The main platform (sometimes referred to as the Abrolhos Bank) is contiguous with the smaller Royal Charlotte Bank to the north and also with two chains of adjacent seamounts, the Minerva Seamount complex along the north and the Vitoria Seamount complex along the south (Figure 1). The platform is covered with literally hundreds of isolated scleractinian coral and coralline algal reef complexes, making this the farthest-south major system of coralline environments found in the Atlantic Ocean. The molluscan biodiversity of the Abrolhos reef complexes is still virtually unknown, but recent preliminary

studies have indicated that the platform houses unusually high levels of both species-richness and endemism, especially in the family Conidae (Petuch, 2013: 157-160; Petuch and Berschauer, 2018: 27-30; 2019: 222-223).

Unlike the adjacent coastal areas of Bahia State, the Abrolhos Platform contains a larger variety of marine habitats, with four main biotopes dominating the region: 1. Coralline algal knolls (rhodoliths) and micro-atolls; 2. Reefs and bioherms composed of stony coral and hydrocoral assemblages, with only four endemic scleractinians (*Mussismilia brasiliensis*, *M. harttii*, *M. hispida*, and *Favia leptophylla*) and two endemic hydrocorals (*Millepora braziliensis* and *M. nitida*) being present (Leão, et al., 2003); 3. Carbonate sand and mud sea floors, mixed with coral rubble, mainly between the reef complexes; and 4. Basaltic rock shorelines on the five volcanic islands of the Abrolhos Archipelago, 53 km offshore. These

four habitat types, inter-fingering across the shallow platform, support the richest molluscan fauna found anywhere along the Brazilian coast. A preliminary survey of Abrolhos taxa (conducted by the senior author and presently unpublished) shows that over 400 species of mollusks are now known from the platform, offshore islands, and seamounts, with approximately 15% being endemic to the area. In the case of the family Conidae, fully 100% of the species present were found to be restricted to the Abrolhos Platform area, demonstrating that they have the highest level of endemism of any gastropod family found on these reef complexes, seamounts, and islands.

The senior author was fortunate enough to be able to accompany a Brazilian marine geologist (Dr. Zelinda Leão, University of Salvador) during her doctoral research on the Abrolhos Platform in 1977, and was the first malacologist ever to conduct a comprehensive survey of the Abrolhos molluscan fauna. This three month survey, conducted on the Timbebas, Pedra Lixa, Guaratibas, Parcel das Paredes, Coroa Vermelha, and Viçosa Reefs and the offshore Abrolhos Archipelago volcanic islands, resulted in the description of ten new gastropods and two new genera (Petuch, 1979; 2013). Since that time, whole teams of dedicated young Brazilian scientists have begun to explore the islands and

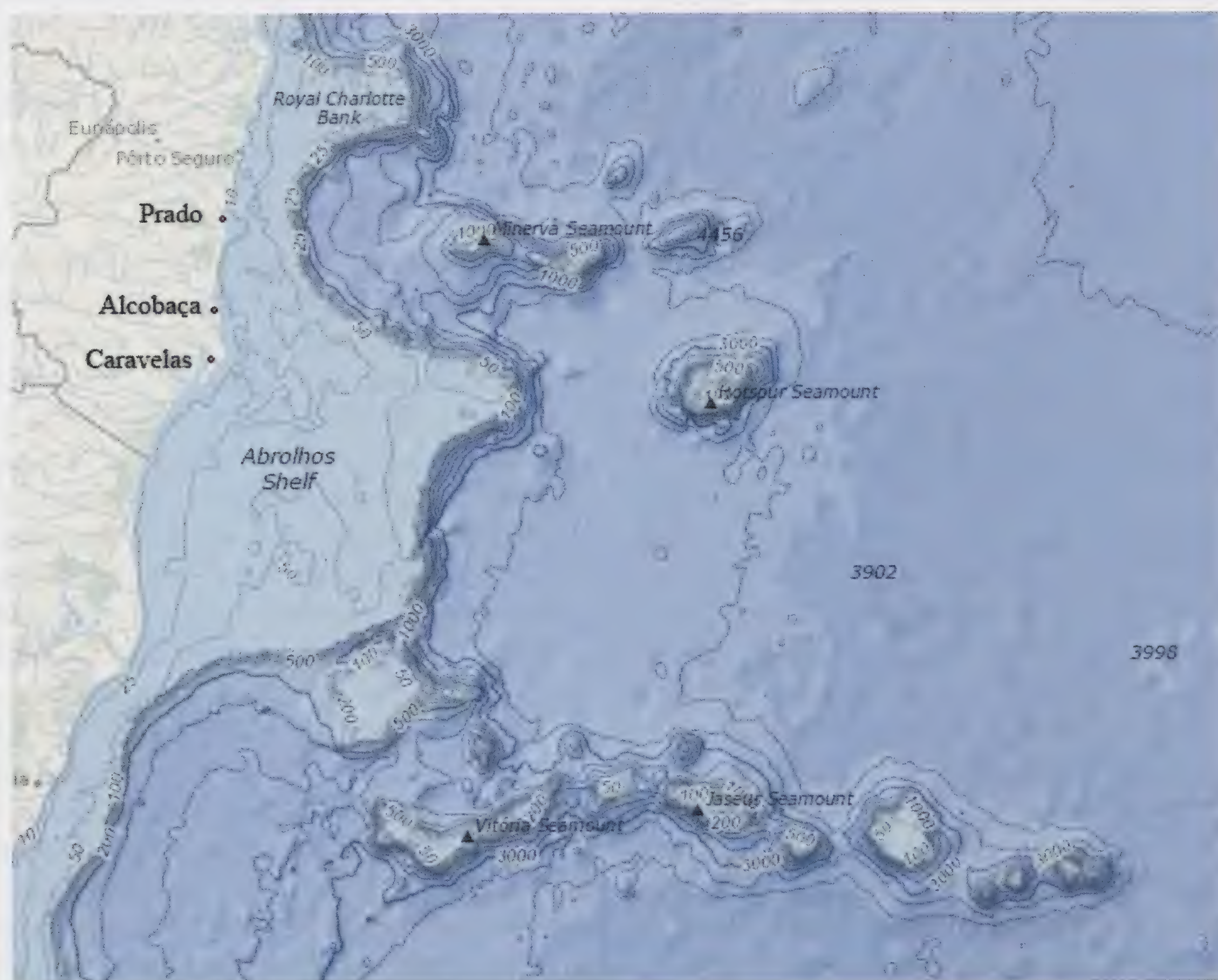


Figure 1. Map showing the Abrolhos Platform off the coasts of southern Bahia State and northern Espírito Santo State, Brazil, along with the contiguous Royal Charlotte Bank and the two main chains of adjacent seamounts. This area is now known to house 17 endemic species of cones shells, and also the endemic genus *Coltroconus*.

reefs of the Abrolhos Platform and have discovered many additional new gastropod taxa, including new species of cones, muricids, volutes, buccinids, and fascioliids. The second author of this paper also discovered and named five new Abrolhos cone shells in a previous work (Coltro, 2004). Recently, we were presented with three new cone species from the Abrolhos Platform and these are described in the following section. The new taxa demonstrate that a total of 17 endemic cone shells are now known to occur on the platform and adjacent seamounts and these are listed at the end of this paper.

SYSTEMATICS

Class Gastropoda

Subclass Sorbeoconcha

Order Prosobranchia

Infraorder Neogastropoda

Superfamily Conoidea

Family Conidae

Subfamily Conilithinae

Genus *Coltroconus* Petuch, 2013

(Type species: *Coltroconus iansa* (Petuch, 1979))

Coltroconus valianti Petuch, Coltro, and
Berschauer, new species
(Figure 2A, B)

Description. Shell of average size for genus, stocky and broad, proportionally wide across shoulder, with elevated, subpyramidal spire; shoulder sharply-angled, ornamented with 12-14 large, rounded knobs; spire whorls slightly scalariform, with heavily coronated early whorls; body whorl smooth and polished, ornamented with 12-14 large, flattened cords and deep grooves around anterior one-half; numerous very faint grooves present on posterior one-half of body whorl; base shell color deep yellow-orange with wide pale yellow band just anterior of mid-body line; lighter band bordered on either side by band of darker tan-orange color;

faint pale yellow zig-zag markings present on mid-body band; shoulder knobs and anterior tip pale yellow; early whorls and protoconch white; aperture proportionally wide, deep yellow within; protoconch bulbous, mamillate, rounded, composed of two whorls.

Type Material. HOLOTYPE - length 12.4 mm, width 6.6 mm, Recife de Arengueira, Abrolhos Platform, Brazil, MZSP 152148 (Figure 2A, B); PARATYPES - Lengths 10 mm and 12.2 mm, same locality and depth as the holotype, in the Petuch research collection; length 10.8 mm, same locality and depth as the holotype, in the Berschauer research collection.

Type Locality. 1-2 m depth on the Recife de Arengueira, Abrolhos Platform, off Caravelas, southern Bahia State, Brazil (17° 44' 45" S, 39° 06' 28" W). Found in crevices on limestone platforms.

Distribution. At present, *Coltroconus valianti* is known only from the Recife de Arengueira coral reef system off Caravelas, southern Bahia State, Brazil.

Etymology. The new species is named for Wesley Valiant de Matos of Alcobaça, Bahia State, Brazil; renowned diver and explorer of the Abrolhos Platform, who has discovered many new endemic species and has contributed greatly to our knowledge of the Bahian molluscan fauna.

Discussion. Of the known *Coltroconus* taxa, the new Abrolhos Platform species is closest to *C. henriquei* Petuch and Myers, 2014 from the adjacent Royal Charlotte Bank (Figure 2G). *Coltroconus valianti* differs from its Royal Charlotte congener in being a narrower and more slender species that it not as broad across the shoulder, in having more numerous and smaller shoulder knobs, in being a more

sculptured shell with more numerous and stronger spiral grooves and ribs, and in being a much more colorful shell, having a deep yellow and orange base color instead of the pale cream-white seen on *C. henriquei*. This new species is the seventh known member of the genus *Coltroconus*, a group of tiny, rotund cones that characteristically exhibit large, rounded knobs and spines along their shoulders and spire whorls, resembling tiny *Stephanoconus* species. The entire genus is endemic to the Abrolhos Platform, Royal Charlotte Bank, and seamounts like the adjacent Sulfur Bank and Minerva Seamount.

Genus *Jaspidiconus* Petuch, 2004

(Type species: *Jaspidiconus jaspideus* (Gmelin, 1791))

Jaspidiconus carlagrezziae Petuch, Coltro, and
Berschauer, new species
(Figure 2C, D)

Description. Shell of average size for genus, elongated and cylindrical, with slightly convex sides; shoulder sharply angled, bordered with thin, slightly raised carina; spire pyramidal, with sloping sides; body whorl ornamented with 18-20 evenly-spaced shallow spiral grooves and low, raised spiral cords which become stronger and more pronounced on anterior half; base color of body whorl white or pale cream-white overlaid with large amorphous reddish-brown flammules, roughly arranged in 2 wide bands; low raised cords marked with brown dots and dashes, producing speckled appearance; edge of shoulder carina marked with large, prominent, evenly-spaced dark brown dots; early spire whorls white; later spire whorls marked with thin, widely-spaced dark brown flammules; aperture proportionally wide, white within interior; protoconch white, exerted and mamillate, composed of 2 ½ whorls.

Type Material. HOLOTYPE - length 21.3 mm, width 10.2 mm, Recife de Areia, Abrolhos Platform, Brazil, MZSP 152149 (Figure 2C, D); PARATYPE - length 19.4 mm, same locality and depth as the holotype, in the Petuch research collection.

Type Locality. 10-25 m depth on the Recife de Areia, Abrolhos Platform, off Alcobaça, southern Bahia State, Brazil (17° 36' 47" S, 39° 04' 02" W). Found in coral rubble and carbonate sand.

Distribution. At present, known only from the Recife de Areia coral reef system off Alcobaça, southern Bahia State, Brazil.

Etymology. The new species is named for Carla Grezzi of São Paulo, SP, Brazil; an inspired amateur naturalist and malacologist, who manages the offices of Femorale São Paulo specimen shells.

Discussion. Of the known Bahian *Jaspidiconus* species, *J. carlagrezziae* is most similar, in general shape and color pattern, to *J. josei* Petuch and Berschauer, 2016 (Figure 2I) from farther north along the Brazilian coast near Salvador. The new Abrolhos species differs from its northern congener in being a smaller, narrower, and more slender shell, in having spiral grooves and cords over the entire body whorl, and in being a less colorful shell that lacks the pale lavender and tan base color that is typical of *J. josei*. Of the known Abrolhos Platform *Jaspidiconus* species, *J. carlagrezziae* is most similar to *J. ramosorum* Petuch and Berschauer, 2019 (Figure 3B), but differs in being a more inflated, less slender shell, in having distinct raised cords on the body whorl, and in being a less colorful shell, lacking the blue base color and the large, dark bluish-brown longitudinal flammules on the body whorl. The new species also differs in the form of the color

pattern on the shoulder and spire whorls, with *J. ramosorum* lacking the band of small brown dots along the shoulder carina and having, instead, widely-spaced dark brown checkers that correspond to the flammules on the spire whorls.

Subfamily Puncticulinae

Genus *Poremskiconus* Petuch, 2013

(Type species: *Poremskiconus archetypus* (Crosse, 1865))

Poremskiconus uhlei Petuch, Coltro, and Berschauer, new species (Figure 2E, F)

Description. Shell of average size for genus, stocky, slightly inflated, with low, flattened spire; shoulder sharply-angled, subcarinate, slightly undulating; body whorl smooth and polished, with 8-10 raised cords around anterior one-third; body whorl consistently solid olive-green with thin band of dark brown and white checker-like flammules around mid-body; spire whorls white, overlaid with closely-packed thin dark brown flammules, arranged in radial pattern; earliest spire whorls bright reddish-pink; white spire color and edges of dark brown spire flammules extend onto edge of shoulder, producing distinct white and dark brown checkered pattern; aperture uniformly narrow, with interior of aperture varying in color from pale olive-green to lavender; protoconch very exerted and projecting, mamillate, composed of 2 ½ whorls, bright red in color.

Type Material. HOLOTYPE - length 21.1 mm, width 11.6 mm, SE of Alcobaça, Abrolhos Platform, Brazil, MZSP 152147 (Figure 2E, F); PARATYPES - lengths 18 mm and 22 mm, same locality and depth as the holotype, in the Petuch research collection; length 21.8 mm, same locality and depth as the holotype, in the Berschauer research collection.

Type Locality. 25-35 m depth on the Abrolhos Platform, southeast of Alcobaça, southern Bahia State, Brazil (17° 58' 57" S, 38° 28' 35" W). Found in coral rubble.

Distribution. At present, known only from coral rubble areas, in 25-35 m depth, off Alcobaça and Praia do Barra, Abrolhos Platform, southern Bahia State, Brazil.

Etymology. Named for Mauricio Sergio Uhle of São Paulo, SP, Brazil, inspired amateur naturalist and malacologist who has aided in the discovery of several new Brazilian mollusks.

Discussion. Of the known Abrolhos Platform *Poremskiconus* species, *P. uhlei* is most similar to *P. pseudocardinalis* (Coltro, 2004) (Figure 2H), both in size and general color pattern. The new species, however, differs from *P. pseudocardinalis* in being a much smoother and less ornamented shell, lacking the strong spiral cords on the body whorl (readily shown here by a comparison of Figures 2E and 2H), in being a broader and more inflated shell, and in having a much lower spire and proportionally wider shoulder. While *P. pseudocardinalis* is highly variable in shell color, most often being red (like Figure 2H), brown, orange, or green, *P. uhlei* is invariant in shell color, being consistently olive-green.

Endemic Cone Shells (Conidae) of the Abrolhos Platform

Unlike other areas of the Brazilian Province and Tropical Western Atlantic Region, the Abrolhos Platform supports only three genera of cone shells. These include the widespread western Atlantic genus *Jaspidiconus*, the southern Caribbean and Brazilian Province restricted genus *Poremskiconus*, and the genus *Coltroconus*, which is completely restricted to the Abrolhos Platform and adjacent seamounts.

The 17 endemic species belonging to these three genera, along with the localities where they have been collected, include:

***Jaspidiconus* Petuch, 2004**

- J. carlagrezziae* Petuch, Coltro, and Berschauer, 2020 (Recife de Areia)
- J. keppensi* Petuch and Berschauer, 2018 (off Alcobaça)
- J. poremskii* Petuch and Myers, 2014 (Corumbau)
- J. ramosorum* Petuch and Berschauer, 2019 (Recife de Viçosa)

***Poremskiconus* Petuch, 2013**

- P. abrolhosensis* (Petuch, 1988) (Parcel das Paredes)
- P. bertarollae* (Costa and Simone, 1997) (Cumuruxatiba)
- P. cargilei* (Coltro, 2004) (off Alcobaça)
- P. pseudocardinalis* (Coltro, 2004) (off Alcobaça)
- P. tonisii* Petuch and Myers, 2014 (Prado)
- P. uhlei* Petuch, Coltro, and Berschauer, 2020 (off Alcobaça)

***Coltroconus* Petuch, 2013**

- C. bianchii* Petuch and Berschauer, 2018 (Minerva Seamount)
- C. bodarti* (Coltro, 2004) (off Alcobaça)
- C. delucaai* (Coltro, 2004) (off Alcobaça)
- C. henriquei* Petuch and Myers, 2014 (Royal Charlotte Bank)
- C. iansa* (Petuch, 1979) (Ilha Santa Barbara, Abrolhos Archipelago)
- C. schirrmeisteri* (Coltro, 2004) (Sulfur Bank)
- C. valianti* Petuch, Coltro, and Berschauer, 2020 (Recife de Arengueira)

These endemic Abrolhos cone shells are illustrated here on Figures 2 and 3. This is the largest cone fauna found in any single area of Brazil and is also the largest endemic cone fauna found within the entire Brazilian Molluscan Province. Another cluster of *Jaspidiconus* is also known to exist in Todos os

Santos Bay, Itaparica Island, and Salvador area of Bahia State, north of the Abrolhos Platform. This swarm of at least nine sibling species, many with very small, limited distributions, was discussed by Petuch and Berschauer, 2018, 2019 and by Petuch and Myers, 2014. Along northern Brazil, in the Cearaian Subprovince (see Petuch, 2013), a species radiation of *Poremskiconus* is also known to exist, with at least seven species being endemic to that subprovincial area. These discoveries have shown that the Brazilian Province conid fauna is far richer than was previously thought. Further explorations on the multitude of coral reefs and coralline algal bioherms on the Abrolhos Platform and isolated seamounts will doubtlessly yield many more new and unnamed cones.

ACKNOWLEDGMENTS

The authors thank the following for their generous donation of Abrolhos study specimens and for sharing their information about the ecology and distribution of the Abrolhos cone shells: Damaso Monteiro (Fortaleza, Brazil and Oporto, Portugal); Wessley Valiant de Matos (Alcobaça, Brazil); Marcus Coltro (São Paulo, Brazil); Dr. Zelinda Leão and Irton Leão (Salvador, Brazil); Olivier Crabos (Salvador, Brazil); Andre Poremski (Washington, D.C. USA); and Mauricio Sergio Uhle (São Paulo, Brazil).

LITERATURE CITED

- Coltro, J., Jr. 2004.** New species of Conidae from Northeastern Brazil (Mollusca: Gastropoda). *Strombus* 11:1-15.
- Leão, Z.M., R. Kikuchi, and V. Testa. 2003.** Corals and Coral Reefs of Brazil. in *Latin American Coral Reefs*. Elsevier Science, Amsterdam, Netherlands. pp. 9-52.

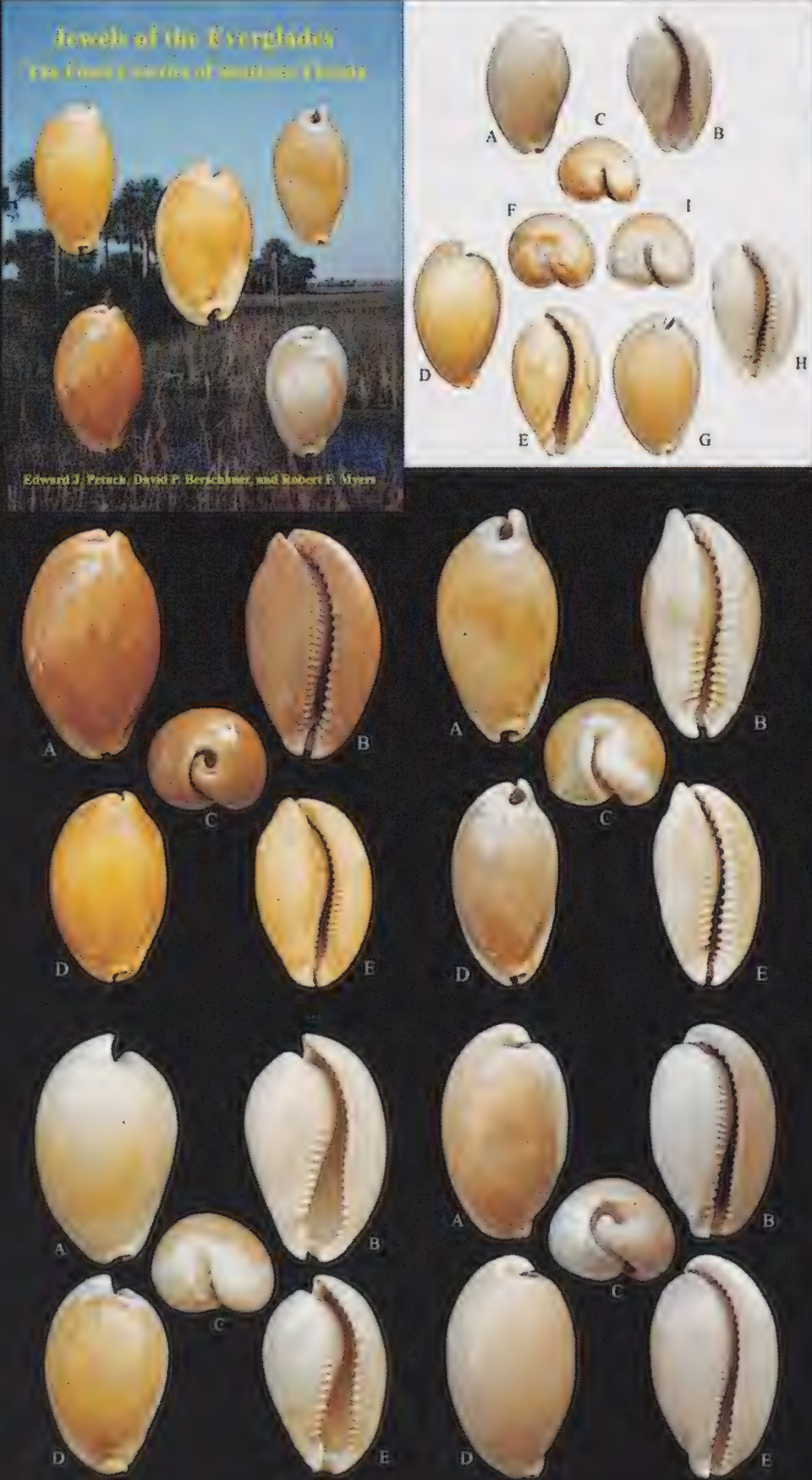
Petuch, E.J. 1979. New Gastropods from the Abrolhos Archipelago and Reef Complex. *Proceedings of the Biological Society of Washington* 92(3):510-526.

Petuch, E.J. 2013. Biogeography and Biodiversity of Western Atlantic Mollusks. CRC Press, Boca Raton, New York, London. 234 pp.

Petuch, E.J. and D.P. Berschauer. 2018. Ten New Cone Shells from Indonesia, the Marquesas Islands, Brazil, and Pacific Panama. *The Festivus* 50(1):17- 32.

Petuch, E.J. and D.P. Berschauer. 2019. New Species of Mollusks (Gastropoda and Bivalvia) from the Tropical Western Atlantic, West Africa, and Red Sea. *The Festivus* 51(3):218-230.

Petuch, E.J. and R. Myers. 2014. New Species of Conidae and Conilithidae (Gastropoda: Conoidea) from the Bahamas, eastern Caribbean, and Brazil. *Xenophora Taxonomy* 3:26-46. (April, 2014).



Jewels of the Everglades
The Conidae of Southern Florida
Edward J. Petuch, David P. Berschauer, and Robert F. Myers

Stratigraphic Period	Age	Location	Number
Pleistocene	Holocene	Everglades	1
		Superior, Sand and Pine	1
		For Thompson	1
		Be's Creek	1
Pleistocene	Holocene	Bernard	1
		Be's Creek	1
		Be's Creek	1
		Be's Creek	1
Pleistocene	Holocene	Be's Creek	1
		Be's Creek	1
		Be's Creek	1
		Be's Creek	1
Pleistocene	Holocene	Be's Creek	1
		Be's Creek	1
		Be's Creek	1
		Be's Creek	1
Pleistocene	Holocene	Be's Creek	1
		Be's Creek	1
		Be's Creek	1
		Be's Creek	1
Pleistocene	Holocene	Be's Creek	1
		Be's Creek	1
		Be's Creek	1
		Be's Creek	1

Available through the San Diego Shell Club - \$100 plus shipping

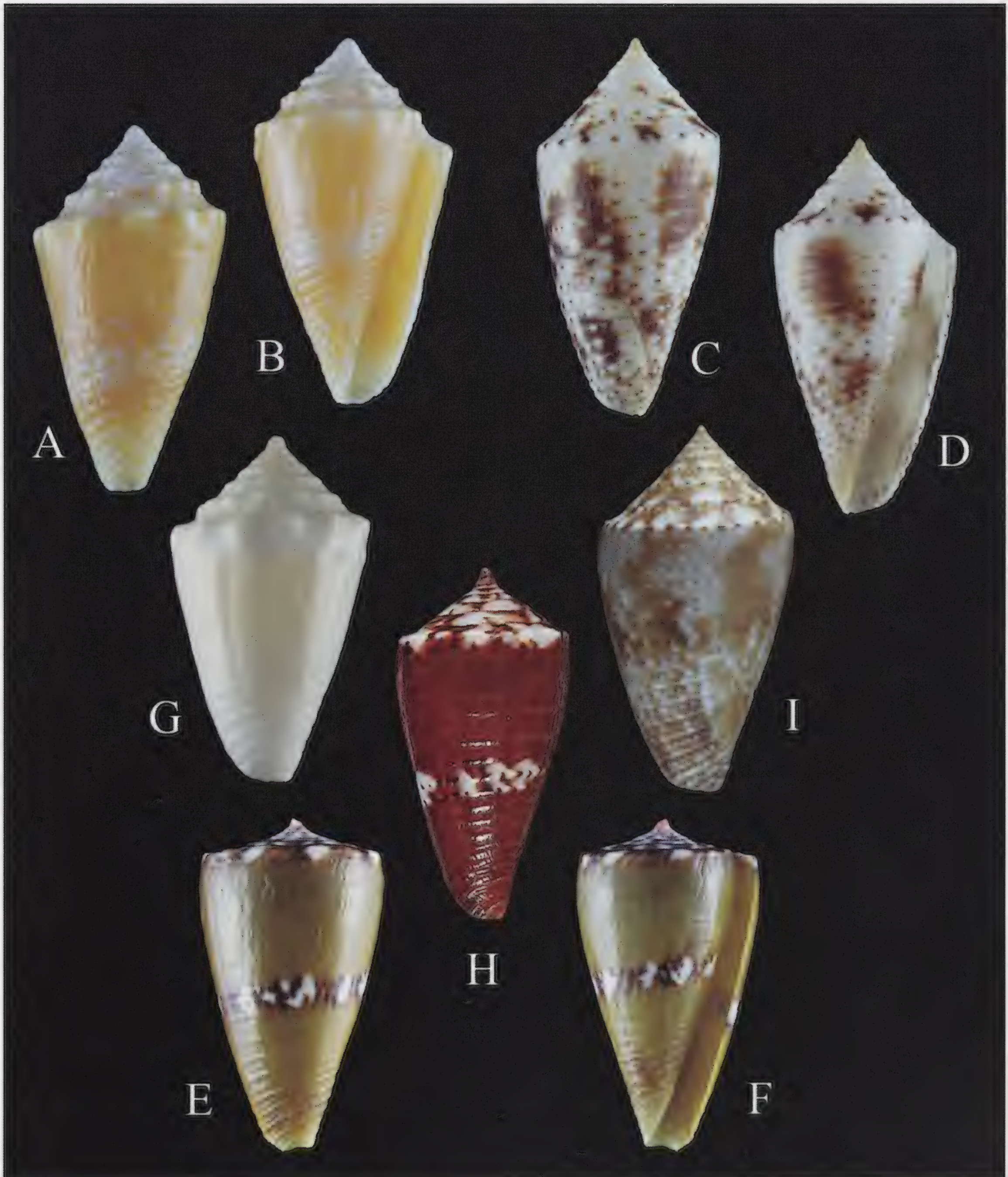


Figure 2. New Cone Shells from the Abrolhos Platform, Brazil.

A, B= *Coltroconus valianti* Petuch, Coltro, and Berschauer, new species, holotype, length 12.4 mm, Recife de Arengueira, Abrolhos Platform, Bahia State, Brazil; **C, D**= *Jaspidiconus carlagrezziae* Petuch, Coltro, and Berschauer, new species, holotype, length 21.3 mm, Recife de Areia, Abrolhos Platform, Bahia State, Brazil; **E, F**= *Poremskiconus uhlei* Petuch, Coltro, and Berschauer, new species, holotype, length 21.1 mm, SE of Alcobaça, Abrolhos Platform, Bahia State, Brazil; **G**= *Coltroconus henriquei* Petuch and Myers, 2014, holotype, length 10 mm, Royal Charlotte Bank, Abrolhos Platform, Bahia State, Brazil (for comparison with *Coltroconus valianti*); **H**= *Poremskiconus pseudocardinalis* (Coltro, 2004), length 17.7 mm, Abrolhos Platform, Bahia State, Brazil (for comparison with *Poremskiconus uhlei*); **I**= *Jaspidiconus josei* Petuch and Berschauer, 2016, length 21 mm, Praia de Guarajuba, Bahia State, Brazil (for comparison with *Jaspidiconus carlagrezziae*).

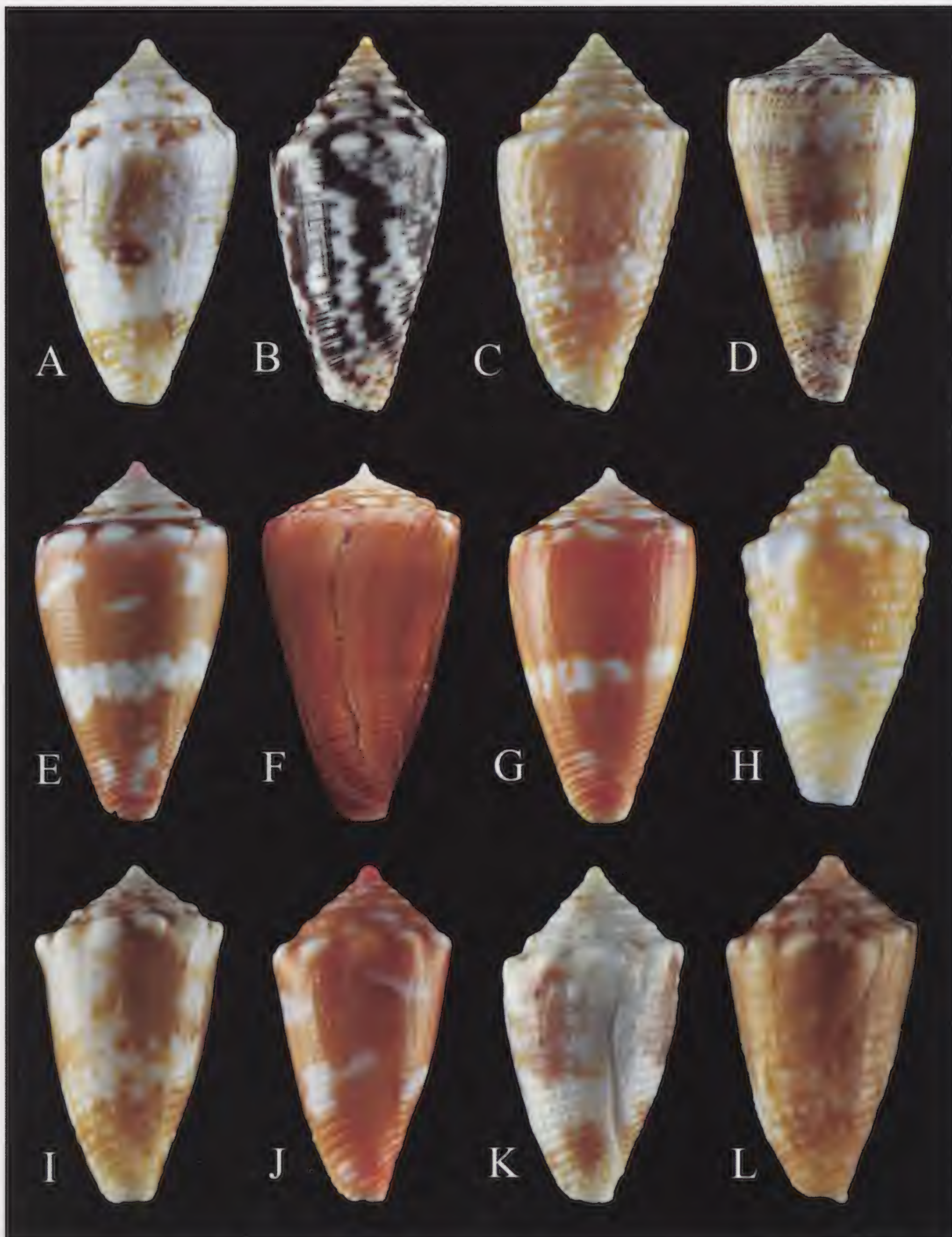


Figure 3. Endemic Cone Shells of the Abrolhos Platform.

A= *Jaspidiconus keppensi* Petuch and Berschauer, 2018, length 10 mm, reefs off Alcobaça (may belong in the genus *Coltroconus*); B= *Jaspidiconus ramosorum* Petuch and Berschauer, 2019, length 22 mm, Viçosa Reef, off Nova Viçosa; C= *Jaspidiconus poremskii* Petuch and Myers, 2014, length 12 mm, reefs off Corumbau; D= *Poremskiconus cargilei* (Coltro, 2004), length 28 mm, Coroa Vermelha Reefs; E= *Poremskiconus abrolhosensis* (Petuch, 1988), length 22 mm, Parcel das Paredes Reefs; F= *Poremskiconus tonisii* Petuch and Myers, 2014, length 26 mm, Prado Reefs; G= *Poremskiconus bertarollae* (Costa and Simone, 1997), length 23 mm, off Cumuruxatiba; H= *Coltroconus bianchii* Petuch and Berschauer, 2018, length 8 mm, Minerva Seamount; I= *Coltroconus bodarti* (Coltro, 2004), length 13 mm, off Santa Barbara Island, Abrolhos Archipelago; J= *Coltroconus delucaii* (Coltro, 2004), length 11 mm, Parcel das Paredes Reefs; K= *Coltroconus iansa* (Petuch, 1979), length 14 mm, Ilha Santa Barbara, Abrolhos Archipelago; L= *Coltroconus schirrmeisteri* (Coltro, 2004), length 8 mm, Sulfur Bank.